Metro Water Services – Nashville, TN

Omohundro WTP 89 Years of Filtration and Counting

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We seem to live a world of "buy it today, throw it away tomorrow, and replace." In the water and wastewater industry we cannot afford to live by this mantra. We must design and build infrastructures that will stand the test of time. It must be sustainable, resilient, reliable and, above all, permanent. I recently gave a presentation at the KY/TN Water Professionals Conference in Nashville, TN, regarding our plant and the longevity of our filters and the plant itself as a whole.

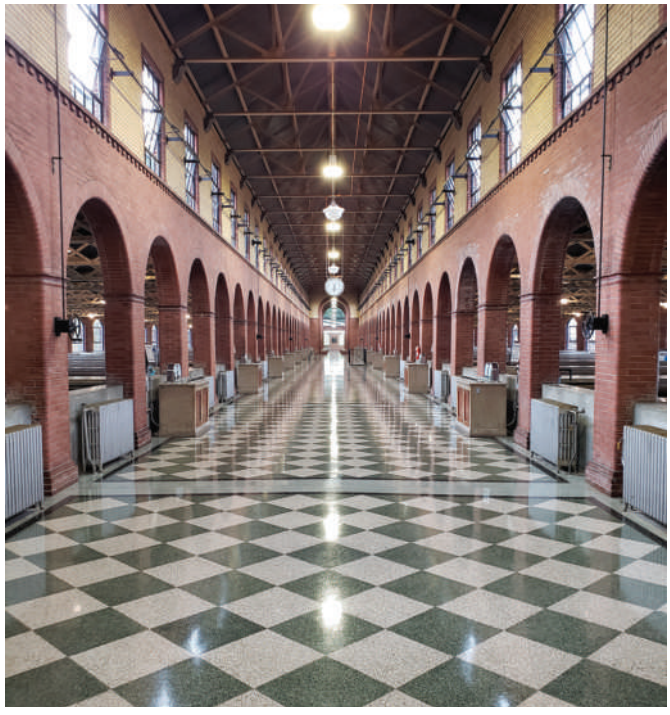
Initially, the Omohundro Water Treatment Plant started out as The George Reyer Pump Station, was completed in 1889 and is still in operation today. The station originally ran from steam generated by the onsite boilers. Electric motors were installed in 1952 and most are still in operation to this day. Three of the pumps installed in the 1800s are also still in operation. Eighty feet below the surface are the original piping and valves in the pump station. Two of these valves are stamped "Cody & Pat July 1873" and are still operated to this day. At the time of completion, the pump station pumped water to our main reservoir, the 8th Avenue Reservoir, which is 51 million gallons in size. Water was pumped into one side, settled slightly, and then went over weirs to the other side. That water was then sent to the city. There was not much treatment with this process, only settling. In the early 1900s, it was decided that some chemicals

would need to be added to the process at the reservoir. Individuals would use rowboats to distribute alum (aluminum sulfate) and hypochlorite of lime for disinfection. The reservoir was not covered at that time but is now, of course.

In 1929, the Filtration Plant was built on the site of the Omohundro complex to treat the water using conventional treatment processes. Twelve filters were built at that time with a production capability of 28 MGD of filtered water. These began as sand filters and are now all dual media filters with the top layer anthracite. Three additions have been made to the Filter Building since then. We now have a total of 30 filters with a filtering capability of 120 MGD. The outside treatment of coagulation, flocculation, and sedimentation is limited to 90 MGD per Tennessee State guidelines. As it stands today, the plant is rated at 90 MGD by State Permit.

The Filter Building, as well as the Pump Station and the Boiler House, are on the National Register of Historic Places. It is an absolutely beautiful structure that has lasted the test of time. It has the likes of terrazzo flooring and solid marble filter consoles. The architecture is something you don't see in current designs. Chester Engineers out of Pittsburg, PA, designed the building and the filters. We have updated all of the controls and other processes but we have been very careful to blend the technology into the old structure so as not to overwhelm the historic architecture. For example: the filter consoles are no longer in service as we have automated all controls with touchscreens and distributed control systems. We have made the conscious decision to hide these touchscreens behind the brick columns so as to only see the original consoles and brick work upon entering the front of the gallery.

In regards to the great design of the filters, Chester Engineers chose to use a false bottom, monolithic style of underdrain that remains in use today. Nozzles are installed on 6" centers in the reinforced concrete underdrain floor. Orthos Nozzles (Orthos Liquid Systems, Inc. BAR Environmental local representative in the Nashville area) replaced the original brass nozzles in 1999. These nozzles are made of durable plastic rather than brass that deteriorates over time. Filters to this day are designed, built, and operated very close to the same way as these original filters. The only notable difference is that modern nozzles of today are designed to hold media, whereas our currently installed nozzles require gravel for the bottom layer to retain media.

Part of the design of the filters includes surface sweep arms. Sweeps are meant to break up the top layer of media that can often collect a significant amount of solids filtered out during the filter process. By doing this, the backwash water can then better wash these solids out of the filter. This process also helps to dissolve mud balls that normally form near the surface of the filter.

The Omohundro Water Treatment Plant runs 24 hours a day and seven days a week. The filters have been in constant operation since 1929 and continue to provide clean, safe drinking water for the citizens of Nashville. The filters constantly produce less than 0.10 Nephelometric Turbidity Units (NTU) and average 125 hours of runtime before a backwash is conducted. The Omohundro Water Treatment Plant is a testament to our forefathers and their forward thinking of ensuring that we are able to produce clean, safe drinking water for our ratepayers for years to come. The plant was designed and built to last the test of time and has proven to be sustainable, resilient, reliable and, above all, permanent!